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Title of the Invention: COMPONENT-BASED AUTOMATIC DOCUMENT  
GENERATION SYSTEM AND METHOD

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## **【TITLE OF THE INVENTION】**

### **COMPONENT-BASED AUTOMATIC DOCUMENT GENERATION SYSTEM AND METHOD**

#### **5 【BRIEF DESCRIPTION OF THE DRAWINGS】**

FIG. 1 shows a schematic diagram of a configuration of a component-based automatic document generation system according to an exemplary embodiment of the present invention.

FIG. 2 shows a diagram of a configuration of a document component  
10 library shown in FIG. 1.

FIG. 3 shows a diagram of a configuration of a document generation rule formulator shown in FIG. 1.

FIG. 4 shows a diagram of a configuration of a document generation rule processor shown in FIG. 1.

15 FIG. 5 shows a flowchart representing an operation for processing an assembly rule in a component assembler shown in FIG. 4.

FIG. 6 shows a flowchart representing an operation for processing a context rule in a context processor shown in FIG. 4.

20 FIG. 7 shows a diagram of a configuration of a document grammar connector shown in FIG. 1.

\* Description of Reference Numerals Indicating Primary Elements in the Drawings

100: WYSIWY-based document generation rule formulator

110: Document generation rule

200: Document generation rule processor  
210: Grammar neutral document  
300: Document component library  
310: Document component summary information  
5 320: Document component  
400: Document grammar connector  
410: Grammar connected document

#### **【 Technical Field】**

10 The present invention relates a method for automatically generating an electronic document used in an e-business environment. More particularly, the present invention relates to a method for generating a document that provides re-usability of an electronic business document and compatibility between different business domains based on document components that are stored in a  
15 document component library that may be jointly used by different e-business systems.

#### **【 Background Art】**

In an Internet-based e-business, electronic documents such as “product catalogs”, “purchase request forms”, and “purchase request response forms”  
20 are sent and received between parties (performing a business transaction) through the Internet using previously established procedures. Various documents are required to perform business transactions, and the documents are quite complicated and they depend on various factors such as geopolitical location, product classification, and business role or industry classification.

Such factors are referred to as business context.

For example, in a conventional e-business environment, if the parties involved are from different countries, the monetary units and exchange rates used in the business documents are different, and different expressions may be used for different industries and may even mean different things for different industries. In addition, the same business documents or business documents having similar portions may be designated and used for business transactions in different business domains. If such difficulties are encountered in large and various business domains, a cost for storing and managing documents may increase, and the business may be complicated. Therefore, overall efficiency is reduced.

#### **【Disclosure】**

#### **【Technical Solution】**

The present invention uses document components as building blocks that may be re-used and that form documents to maximize the re-usability of business documents and allow cooperation between different businesses. The document component expresses a specific concept that is independent from a semantic meaning. That is, the document component “postal address” refers to a mailing address but, depending on the circumstances, may mean “sender address”, “receiver address”, “business address”, “home address”, etc. For example, a document component having the meaning of “sender address” in one business domain may have the meaning of “business address” in another business domain. This may cause problems if the different parties involved

interpret the meaning of "sender address" differently. However, if the same "address" document component is used, no confusion will arise. The present invention has been made in an effort to provide a system and a method for designating the document component, storing the document component in a document component library that may be commonly used in each business system, collecting the required document components by a document generating rule processor based on an assembling rule and a context rule, and automatically assembling the document components. Accordingly, differences between systems are overcome when the e-business is performed, re-usability of business documents is maximized, and therefore the e-business may be efficiently performed.

## 【Best Mode】

An exemplary embodiment of the present invention will be described with reference to the figures.

FIG. 1 shows a schematic diagram of a configuration of a component-based automatic document generation system according to an exemplary embodiment of the present invention. In an exemplary embodiment of the present invention, a user is required to generate a document generation rule 110 by using a document generation rule formulator 100 to generate a business document. The document generation rule formulator 100 is a tool that allows users to conveniently designate document generation rules through a graphic user interface. In addition, the document generation rule formulator 100 searches document component summary information 310 from a document component library 300 to formulate the document generation rule 110. The generated document generation rules 110 are used by a document generation rule processor 200 to generate a grammar neutral document object 210. During this process, the document generation rule processor 200 collects and uses document components 320, which are required for document assembly, from the document component library 300. Eventually, the grammar neutral document objects 210, which are in a suitable form for processing by a program of a computer system, are converted by a document grammar connector 400 into a grammar connected document 410 in a string type, which is recognizable by the user, and the grammar connected document 410 is stored on a disk.

FIG. 2 shows a diagram of a configuration of the document component library shown in FIG. 1. The document component library 300 is a public

storage area for storing and managing document components that can be commonly used in each business system. The document component library 300 stores a variety of the document components 320 that constitute business documents, and the document component summary information 310 that records detailed information on all the components included in the present library. In addition, a component library interface 340 is provided to connect the document component library 300 to external modules. The document generation rule formulator 100 searches the document component summary information 310 through the component library interface 340, and the document generation rule processor 200 uses a document component ID 330 provided to each component as a specific number to collect document components required for document assembly. The document components according to the exemplary embodiment of the present invention include a simple component formed in a single type and a complex component including a plurality of simple components.

FIG. 3 shows a schematic diagram of a configuration of the document generation rule 110 shown in FIG. 1. The document generation rule formulator 100 is a tool that allows a user to conveniently designate a document generation rule through a graphic user interface, and it includes a document component assembler 101, a component selector 102, and a context condition compiler 103. Based on the document component summary information 310 searched from the document component library 300, the component selector 102 displays usable component items that are provided by a corresponding library. The contents of the document component summary information 310



are required to include a component ID, a component name, and a component type, and may also include various different types of information that represent other components. The document component assembler 101 is an area where component structures are modeled based on user input through the graphic user interface. The user drags the required document components appearing in the component selector 102 and drops them at a suitable location in the document component assembler 101 to generate document structures. Such structures are formulated as assembly rules 111. The assembly rules 111 include IDs of all document components and structural information between each component. The context condition compiler 103 is an area where context conditions realized through pairs of condition and action sentences are compiled to enable insertion into document structures. The context condition compiler 103 enables the formulation of context rules 112, which allow the action sentences to be processed, when conditions satisfy a specific business context during document assembly in the document generation rule processor 200. The assembly rules and context rules are output as a single document generation rule 110.

FIG. 4 shows a schematic diagram of a configuration of the document generation rule processor 200 shown in FIG. 1. The document generation rule processor 200 is a module for generating the grammar neutral document objects 210 based on the document generation rules 110 made in the document generation rule formulator 100, and it includes a component assembler 201 that processes the assembly rule 111, and a context processor 202 that processes the context rule 112. The component assembler 201 reads an assembly rule

in the document generation rules 110, collects the document components 320 required in the assembly rule from the document component library 300 by using the document component ID 330, assembles the collected document components 320 by using the structural information between components, and  
5 outputs an assembled component 203. The context processor 202 reads a context rule in the document generation rules 110, and if a specific business context 220 satisfies the condition sentence of the context rule, applies the designated action sentence to the assembled components so as to generate the grammar neutral document objects 210. As an example of a context  
10 condition, "Condition(Geopolitical='KR'), Rename('Address', '주소')" is an instruction to change, when the geopolitical environment of the business document is Korea (KR), the component name of 'Address' in the assembled component structure to '주소', which means address in the Korean language.

FIG. 5 shows a flowchart representing an operation for processing the  
15 assembly rule 111 in the component assembler 201 shown in FIG. 4. The detailed processes involved in reading the assembly rules 111 and assembling the document components 320 are illustrated in FIG. 5.

FIG. 6 shows a flowchart representing an operation for processing the  
context rule 112 in the context processor 202 shown in FIG. 4. The detailed  
20 processes involved in reading the context rules 112 and generating the document objects 210 are illustrated in FIG. 6.

FIG. 7 shows a diagram of a configuration of the document grammar connector 400 shown in FIG. 1. The grammar neutral document object 210 generated in the document generation rule processor 200 is a memory

structural object having an appropriate form for being processed in a program of a computer system. The grammar neutral document object 210 is converted into a grammar-connected document object by a grammar converter 401 that supports grammar (e.g., XML schema, XML DTD, EDI MIG) suitable for a specific business system. Then, the grammar neutral document object 210 is realized as a grammar-connected document 410 through a document output unit 402. The grammar-connected document 410 is used in an actual business and is formed in the string type recognizable by a user.

#### **【Advantageous Effects】**

In a conventional e-business environment, when the business environments of parties involved in a business transaction are dissimilar, it is possible for the different parties to have contrasting interpretations of the expressions used in the business documents. In addition, the same business documents or business documents having similar portions may be designated and used for business transactions in different business domains. If such difficulties are encountered in large and various business domains, a cost for storing and managing documents may increase, and the business may be complicated. Therefore, overall efficiency is reduced. Accordingly, according to the exemplary embodiment of the present invention, differences between systems are overcome when the e-business is performed, re-usability of business documents is maximized, and therefore the e-business may be efficiently performed.